AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A method of operating an electrochemical fuel cell having an anode, an ion transfer membrane, and a cathode, comprising ~~the steps of~~:

delivering fluid fuel to fluid flow channels within the anode;

delivering fluid oxidant to fluid flow channels within the cathode;

exhausting reaction by-products and ~~any~~ unused oxidant from the fluid flow channels within the cathode; and

delivering a sufficient quantity of liquid water to the fluid flow channels within the cathode such that a relative humidity of 100% is maintained substantially throughout the fluid flow channels.

2. (Currently Amended) The method of claim 1, ~~in which the step of~~ wherein delivering a sufficient quantity of liquid water comprises:

determining a maximum ~~in~~ fuel cell voltage as a function of liquid water flow rate; and

delivering at least a minimum water flow rate corresponding to ~~said~~ the maximum fuel cell voltage ~~maximum~~.

3. (Currently Amended) The method of claim 1, which is performed on ~~applied to~~ a plurality of ~~such cells~~ electrochemical fuel cells in a fuel cell stack;[[,]] ~~in which the step of~~ wherein delivering a sufficient quantity of liquid water comprises:

determining a maximum ~~in~~ stack voltage as a function of liquid water flow rate; and

delivering at least a minimum water flow rate corresponding to ~~said~~ the maximum stack voltage ~~maximum~~.

4. (Currently Amended) The method of claim 1, ~~claim 2 or claim 3~~ further comprising: ~~including the step of~~ increasing the quantity of liquid water delivered as a function of fuel cell ~~or stack~~ current to maintain a water factor WF > 1.0 for all currents within a normal operating range of the fuel cell ~~or stack~~.

5. (Currently Amended) The method of claim 2, wherein ~~in which the step of~~ delivering a sufficient quantity of liquid water comprises:

determining a maximum ~~in~~ cell voltage as a function of liquid water flow rate for each of a plurality of fuel cell currents that correspond to a normal range of operating conditions of the fuel cell;[[,]]

determining a calibration function expressing a minimum liquid water flow rate as a function of current and/or air stoichiometry; and

delivering at least ~~said~~ the minimum liquid water flow rate, for the current drawn from ~~said~~ the fuel cell and/or for the air stoichiometry, as determined by the calibration function.

6. (Currently Amended) The method of claim 3, wherein ~~in which the step of~~ delivering a sufficient quantity of liquid water comprises :

determining a maximum ~~in~~ stack voltage as a function of liquid water flow rate for each of a plurality of stack currents that correspond to a normal range of operating conditions of the stack;[[,]]

determining a calibration function expressing a minimum liquid water flow rate as a function of current and/or air stoichiometry; and

delivering at least ~~said~~ the minimum liquid water flow rate, for the current drawn from ~~said~~ the stack and/or for the air stoichiometry, as determined by the calibration function.

7. (Currently Amended ) The method of claim 5, wherein ~~or claim 6 in which~~ the calibration function is determined for air stoichiometry in ~~the~~ a range 1.1 to 10.

8. (Currently Amended) The method of claim 7, wherein ~~in which~~ the calibration function is determined for air stoichiometry in ~~the~~ a range 1.4 to 4.0.

9. (Currently Amended) The method of ~~any preceding~~ claim 1, wherein ~~in which the step of~~ delivering a sufficient quantity of liquid water comprises delivery of a water factor of at least 1.5.

10. (Currently Amended) The method of claim 9, wherein ~~in which the step of~~ delivering a sufficient quantity of liquid water comprises delivery of a water factor of at least 3.

11. (Currently Amended) The method of claim 9, wherein ~~or claim 10 in which the step of~~ delivering a sufficient quantity of liquid water comprises delivery of a water factor of less than 40.

12. (Currently Amended) The method of claim 11, wherein ~~in which the step of~~ delivering a sufficient quantity of liquid water comprises delivery of a water factor in the range from 3 to 6.

13. (Currently Amended) The method of ~~any preceding~~ claim 1 further ~~including the step of~~ comprising:

temporarily permitting delivery of a quantity of liquid water to the fluid flow channels within the cathode such that a relative humidity of less than 100% is maintained when ~~the cathode~~ an exhaust temperature of the cathode is below a predetermined threshold corresponding to a sub-optimal operating temperature.

14. (Currently Amended) The method of claim 13, which is applied upon start-up of the fuel cell ~~or fuel cell stack~~.

15. (Currently Amended) The method of claim 1, wherein ~~in which~~ the fuel cell is operated such that, for any measured fuel cell power delivery, a liquid water injection rate into the cathode and/or gas flow through the cathode are controlled to ensure that there is more liquid water ~~at~~ in all regions of ~~the~~ a cathode surface than can be evaporated in ~~the~~ prevailing temperature and pressure conditions.

16. (Currently Amended) The method of claim 15, which is performed on ~~applied to~~ a plurality of ~~such~~ electrochemical fuel cells in a fuel cell stack having a common oxidant supply manifold and a common water injection manifold such that, for any measured stack power delivery, liquid water injection rate into the water injection manifold and/or gas flow rate in the oxidant supply manifold are controlled to ensure that there is more liquid water ~~at~~ in all regions of ~~the~~ cathode surfaces of all of the fuel cells than can be evaporated in ~~the~~ prevailing temperature and pressure conditions.

17. (Currently Amended) An electrochemical fuel cell assembly comprising:

at least one anode fluid flow field plate having fluid flow channels therein;

at least one ion transfer membrane;

at least one cathode fluid flow field plate having fluid flow channels therein;

~~means~~ a mechanism for delivering fluid fuel to the anode fluid flow channels;

~~means~~ a mechanism for delivering fluid oxidant to the cathode fluid flow channels; and

a water injection mechanism for delivering a sufficient quantity of liquid water to the fluid flow channels within the cathode such that a relative humidity of 100% is maintained substantially throughout the fluid flow channels during normal operating conditions of the fuel cell.

18. (Currently Amended) The assembly of claim 17, wherein ~~in which~~ the water injection mechanism comprises a pump and a controller.

19. (Currently Amended) The assembly of claim 18, wherein ~~in which~~ the controller ~~includes~~ comprises a voltage sensor for sensing a fuel cell ~~or fuel cell stack~~ voltage.

20. (Currently Amended) The assembly of claim 19, wherein ~~in which~~ the controller is ~~adapted~~ configured to operate in a calibration mode comprising determining a maximum ~~in~~ cell voltage as a function of liquid water flow rate for each of a plurality of normal fuel cell or fuel cell stack operating currents.

21. (Currently Amended) The assembly of claim 20, wherein ~~in which~~ the calibration mode further comprises determining a calibration function expressing a minimum liquid water flow rate as a function of current and air stoichiometry.

22. (Currently Amended) The assembly of claim 18, further ~~including~~ comprising:

a current sensor for sensing current flow through the fuel cell or through a fuel cell stack;[[,]] ~~and in which~~

wherein the controller is ~~adapted~~ configured to control a water injection rate to maintain delivery of a water factor WF > 1.0 for all fuel cell or fuel cell stack currents within a normal operating range.

23. (Currently Amended) The assembly of claim 22, wherein ~~in which~~ the controller is ~~adapted~~ configured to control the water injection rate to maintain delivery of a water factor of at least 1.5.

24. (Currently Amended) The assembly of claim 23, wherein ~~in which~~ the controller is ~~adapted~~ configured to control the water injection rate to maintain delivery of a water factor of less than 40.

25. (Currently Amended) The assembly of claim 24, wherein ~~in which~~ the controller is ~~adapted~~ configured to control the water injection rate to maintain delivery of a water factor of at least 3.

26. (Currently Amended) The assembly of claim 18, wherein ~~in which~~ the controller is ~~adapted~~ configured to control the water injection rate to maintain of delivery of a water factor in a ~~the~~ range from 3 to 6.

27. (Currently Amended) The assembly of ~~any one of claims 17 to 26~~ claim 17, further ~~including~~ comprising:

a mechanism ~~means~~ for temporarily permitting delivery of a quantity of liquid water to the fluid flow channels within the cathode such that a relative humidity of less than 100% is maintained when ~~the~~ a cathode exhaust temperature is below a predetermined threshold corresponding to a sub-optimal operating temperature.

28 and 29. (Cancelled)